



MEMORANDUM

To: EPA
Copy To: File 80021
From: J. Brunelle, J. Lambert
Subject: Olin Chemical Superfund Site – GW Hotspot/Downgradient Control Conceptual Model Memorandum
Date: 7/19/19

Nobis Group® (Nobis) has developed this Technical Memorandum (Memo) to support the U.S. Environmental Protection Agency's (EPA) review of the Draft Interim Action Feasibility Study (IAFS) (Wood Environment & Infrastructure Solutions [Wood], 2019) and the development of additional groundwater alternatives to address highly contaminated groundwater at the Olin Chemical Superfund Site (the Site).

Wood proposed one groundwater alternative including downgradient control through wellhead treatment via water supply wells located at the Butter's Row Water Treatment Plant in the IAFS; however, EPA requested that Nobis propose additional, more intensive alternatives to address groundwater hotspots and/or the further migration of the n-nitrosodimethylamine (NDMA) plume. EPA considers NDMA to be the primary risk driver at the Site.

This memo presents a conceptual model for groundwater recovery well locations, as well as associated piping and treatment plant placement to address groundwater hotspots or control the downgradient flow of the NDMA plume.

1.0 HOTSPOT REMEDIATION AND DOWNGRADIENT PLUME CONTROL

This memo includes a depiction of three separate plumes of highly contaminated groundwater. NDMA is depicted using three separate contour intervals consisting of 11,000, 5,000, and 1,100 nanograms per liter (ng/l) concentrations, as developed in Nobis' Revised evaluation of DAPL (dense aqueous phase liquid) and NDMA to support Feasibility Study review and development of DAPL and groundwater alternatives Memo dated July 19, 2019.



Conceptual models for well and associated infrastructure placement for the remediation 1,100, 5,000, and 11,000 ng/l NDMA hotspots are shown on Figures 1, 2, and 3, respectively. These wells have been placed to capture the contaminated groundwater throughout the hotspots.

The proposed hotspot locations were selected to provide distribution across the target areas; however, the size of the potential groundwater capture zone and therefore the number of wells may require adjustment based on a more detailed evaluation of the local hydrogeology, including project-scale hydraulic conductivity, gradients, and configuration of confining units (if present).

Figure 4 depicts well locations for downgradient control of the contaminant plume. These wells have been placed to intercept contamination migrating off-site to the MMBW, thereby cutting off the plume and allowing for natural attenuation downgradient while preventing further migration of contamination at the DAPL pools.

Some of the downgradient groundwater and groundwater within the presumed source area (the DAPL pools) would not be directly addressed by these wells; however, because these wells would not be sited directly above a DAPL pool, they are less likely to impact groundwater by drawing more heavily-impacted groundwater from the DAPL pools and increasing contaminant diffusion. In addition, pumping at these locations would likely be easier to implement.

2.0 ASUMPTIONS

Infrastructure locations were selected in accordance with the following conditions, limitations, and assumptions:

- Nobis assumes that adequate treatment train technology exists for the effective treatment of NDMA within the proposed treatment plants, as well as other Site contaminants of concern that have been identified in DAPL and center plume groundwater.
- Nobis assumes that access agreements, other legal agreements, and permission can be obtained for the proposed locations.
- Nobis placed wells and associated infrastructure in locations that are permitted by Site conditions, specifically:
 - Existing structures, roadways and other right-of-ways, the containment area, bedrock elevations, the groundwater divide, and other physical Site characteristics were taken into consideration when selecting recovery well locations.

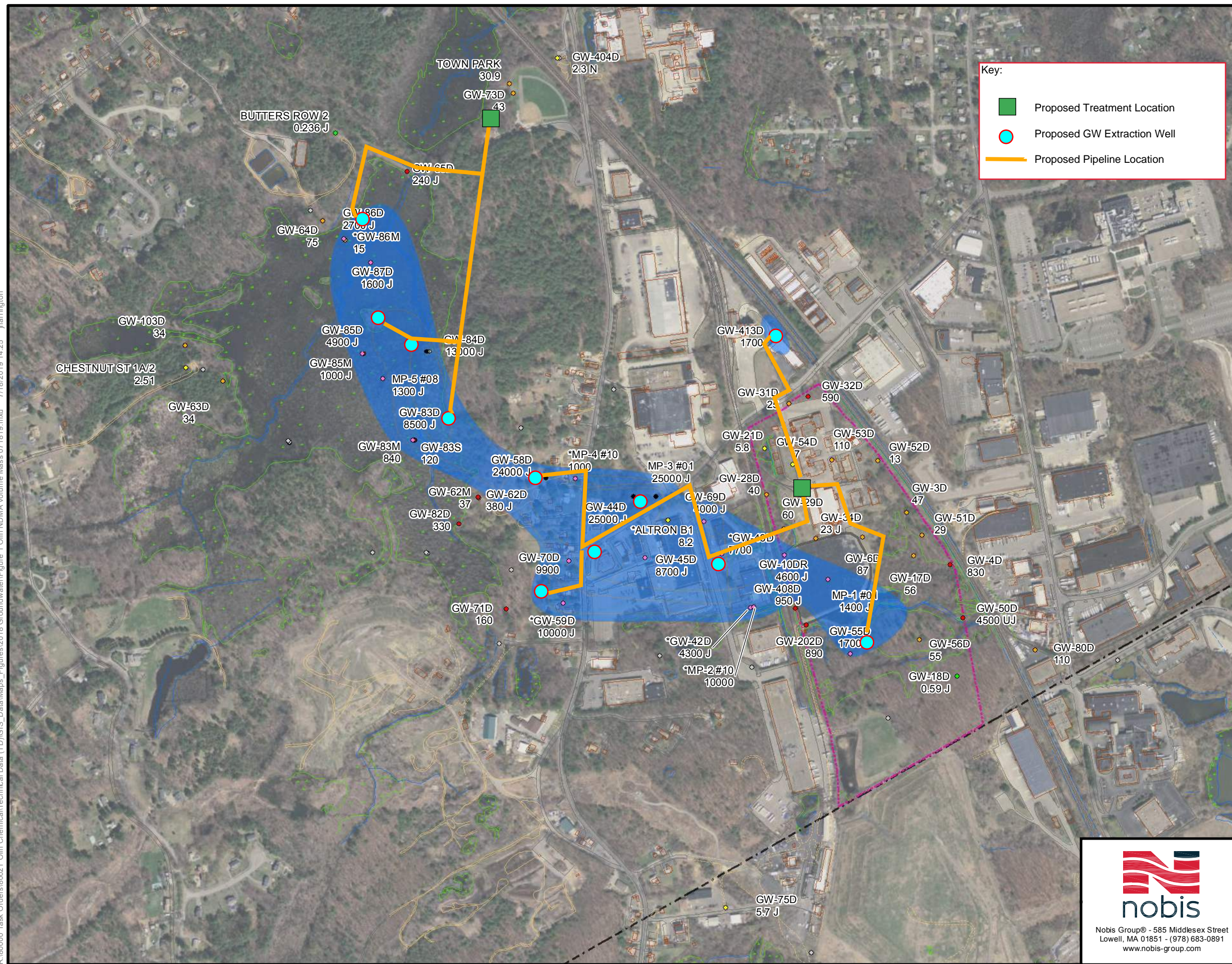


- To the extent possible, locations within the Maple Meadow Brook Wetland (MMBW) were placed in areas of relatively high ground and/or locations close to the edge of the MMBW to minimize infrastructure impacts and access issues.
- Piping runs were run in a direct route, along right-of ways, and along existing DAPL recovery infrastructure when possible.
- Recovery wells were not placed directly over DAPL pools, if possible, to avoid potential fouling in DAPL were to be drawn into the wells.
- Nobis's concept did not take cost into account.
- Nobis has not fully developed the alternative. This is a conceptual layout of groundwater recovery infrastructure only.

3.0 REFERENCES

Nobis, 2019. Olin Chemical Superfund Site: Evaluation of DAPL and NDMA to support Feasibility Study review and development of DAPL and groundwater alternatives. July 19.

Wood, 2019. Draft Interim Action Feasibility Study, Olin Chemical Superfund Site, Wilmington, Massachusetts. April.



Notes:

1. Maximum result from 2010-2017 sampling events is labeled. If data are not available from 2010-2017, the most recent detection from 2003-2017 is included and labeled with an asterisk.

2. All concentrations shown are in nanograms per liter (ng/L).

3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

**NDMA in Deep Overburden
Tapwater RSL = 0.11 ng/L**

- < Reporting Limit
- 0.11 - 1.1
- 1.1 - 11
- 11 - 110
- 110 - 1,100
- 1,100 - 11,000
- 11,000 - 110,000

NDMA Concentration
> 1100 ng/L

———— Paved Road

—— Unpaved Road

— Rail

----- Site Boundary

Water Features

Buildings

Wetlands



1 inch = 600 feet



FIGURE 1

1,100 ng/l NDMA HOTSPOT
CONCEPTUAL MODEL
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSASHUSETTS

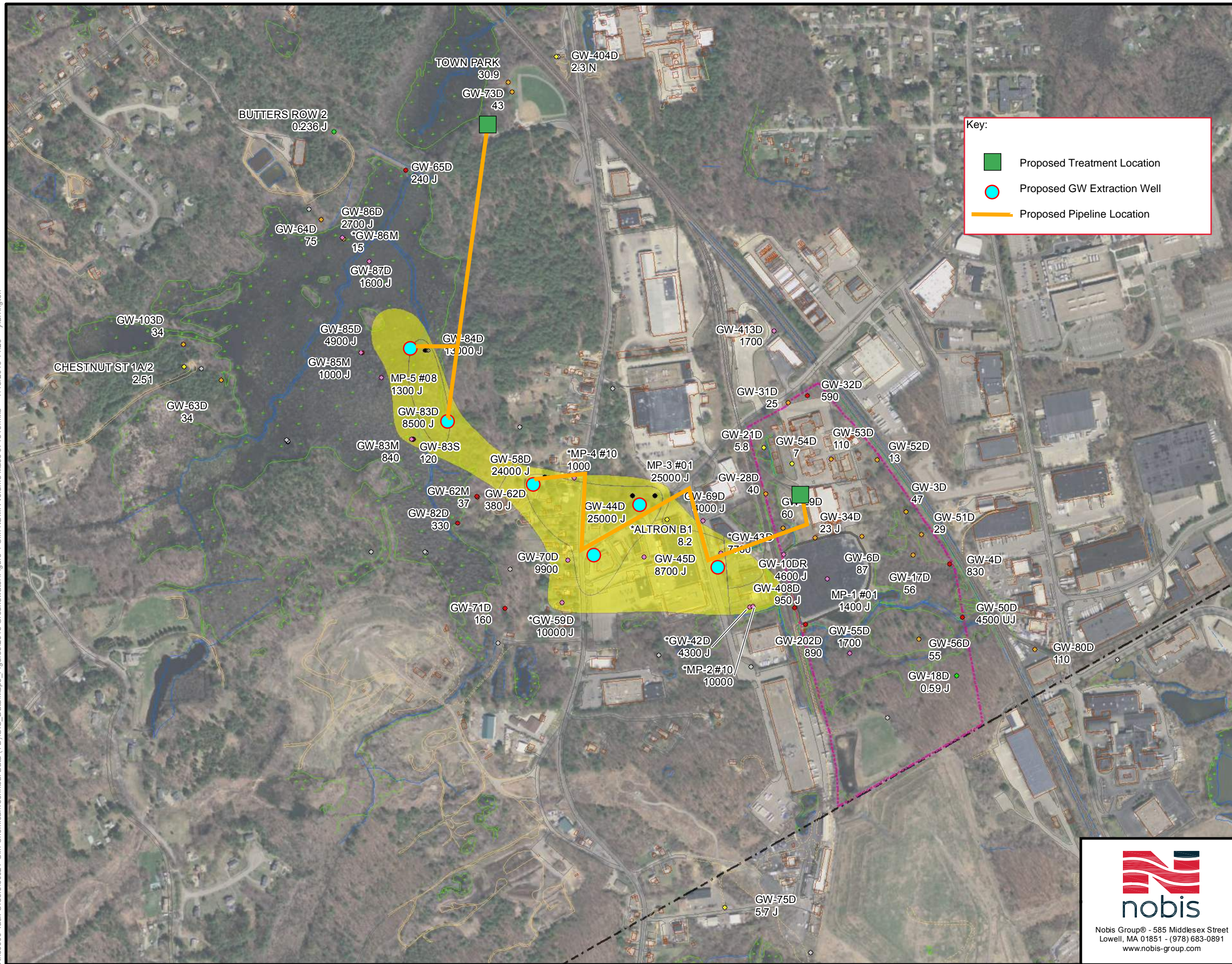
PREPARED BY: JH
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CHECKED BY: JL
DATE: JULY 2019



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R:\80000 Task Orders\80021 Olin Chemical\Technical Data (TD)\GIS_Data\Maps_Figures\2018 Groundwater\Figure 1 Olin NDMA Volume Mass 071819.mxd 7/18/2019 14:26 jharrington



Notes:

1. Maximum result from 2010-2017 sampling events is labeled. If data are not available from 2010-2017, the most recent detection from 2003-2017 is included and labeled with an asterisk.
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3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

NDMA in Deep Overburden Tapwater RSL = 0.11 ng/L

- < Reporting Limit
- 0.11 - 1.1
- 1.1 - 11
- 11 - 110
- 110 - 1,100
- 1,100 - 11,000
- 11,000 - 110,000
- NDMA Concentration > 5000 ng/L
- Paved Road
- Unpaved Road
- Rail
- Site Boundary
- Water Features
- Buildings
- Wetlands

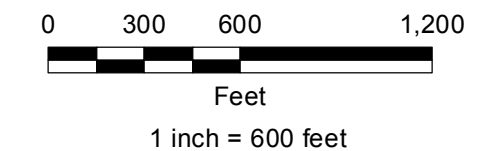


FIGURE 2

5,000 ng/l NDMA HOTSPOT
CONCEPTUAL MODEL
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSASHUSETTS

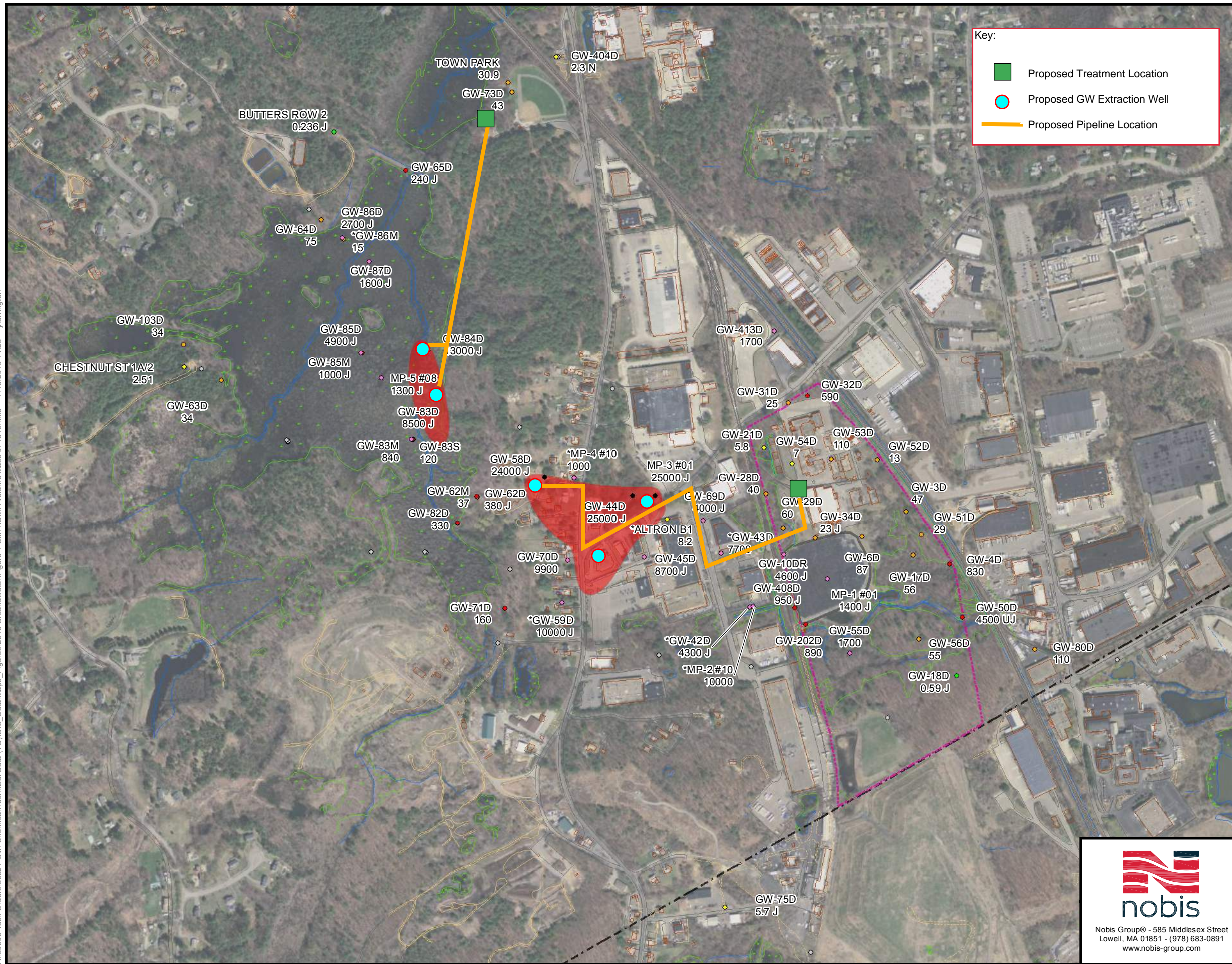
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Key:

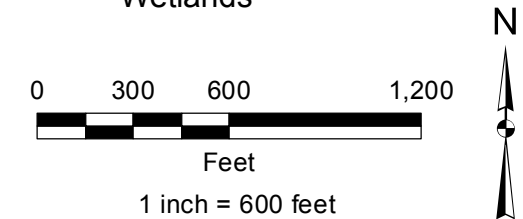
- Proposed Treatment Location
- Proposed GW Extraction Well
- Proposed Pipeline Location

- Notes:**
- Maximum result from 2010-2017 sampling events is labeled. If data are not available from 2010-2017, the most recent detection from 2003-2017 is included and labeled with an asterisk.
 - All concentrations shown are in nanograms per liter (ng/L).
 - Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

NDMA in Deep Overburden
Tapwater RSL = 0.11 ng/L

- < Reporting Limit
- 0.11 - 1.1
- 1.1 - 11
- 11 - 110
- 110 - 1,100
- 1,100 - 11,000
- 11,000 - 110,000
- NDMA Concentration > 11000 ng/L
- Paved Road
- Unpaved Road
- Rail
- Site Boundary
- Water Features
- Buildings
- Wetlands

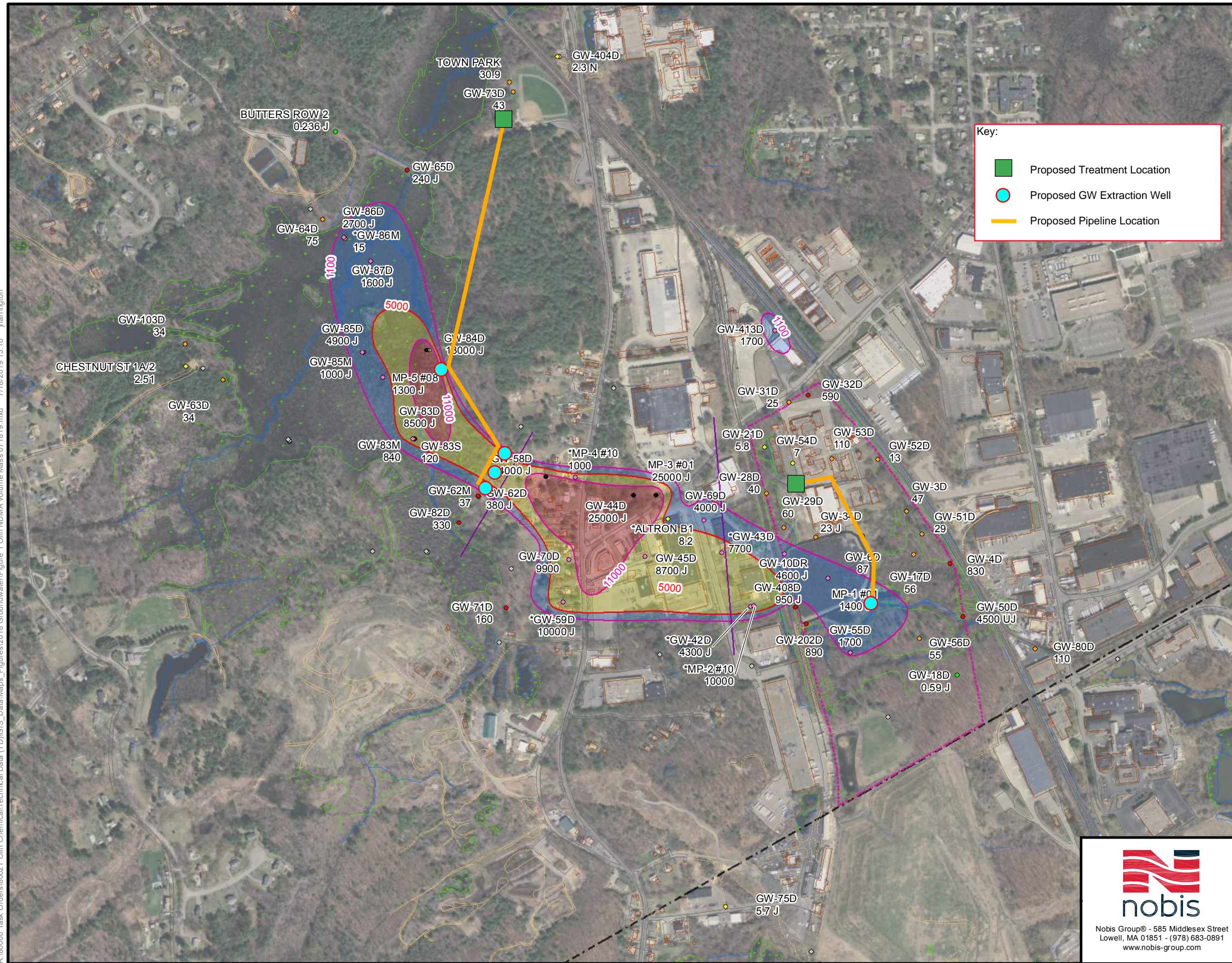


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FIGURE 3	
11,000 ng/L NDMA HOTSPOT CONCEPTUAL MODEL OLIN CHEMICAL SUPERFUND SITE WILMINGTON, MASSASHUSETTS	
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Notes:

1. Maximum result from 2010-2017 sampling events is labeled. If data are not available from 2010-2017, the most recent detection from 2003-2017 is included and labeled with an asterisk.
2. All concentrations shown are in nanograms per liter (ng/L).
3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

NDMA in Deep Overburden Tapwater RSL = 0.11 ng/L

- < Reporting Limit
- 0.11 - 1.1
- 1.1 - 11
- 11 - 110
- 110 - 1,100
- 1,100 - 11,000
- 11,000 - 110,000

- NDMA Isococentration Contour
- Inferred NDMA Contour
- Paved Road
- Unpaved Road
- Rail
- Site Boundary
- Water Features
- Buildings
- Wetlands

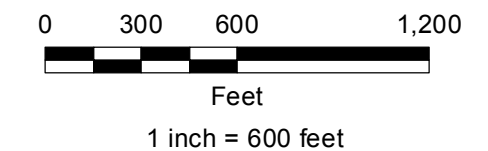


FIGURE 4

DOWNGRADIENT PLUME CONTROL
CONCEPTUAL MODEL
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSASHUSETTS

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